

Claims

We claim:

1. A method of recovering metal from waste plating stream and using the recovered metal comprising:

providing a waste metal plating stream containing metal ions in an aqueous solution;

passing the waste metal plating stream containing the metal ions into an electrochemical cell assembly having an inlet for the waste metal plating stream, a plurality of alternating anodes and cathodes porous to the waste metal solution and an exit from the cell ;

passing the waste metal plating stream through pores of the cathode;

passing an electrical current through the anodes and cathodes, thereby depositing a portion of the metal ions onto the cathodes and reducing the amount of the metal ion in the solution from that in the introduced waste metal plating stream;

recovering the deposited metal from the cathode; and

using the recovered deposited metal as a source of metal to be deposited on to a substrate in a subsequent metal plating process.

2. The process of claim 1 wherein the waste metal plating solution is comprised of the metal ions cadmium, cobalt, copper, lead, nickel, zinc, chromium or precious metal ions or mixtures thereof.

3. The process of claim 1 wherein the waste metal plating solution is comprised of nickel metal ions.

4. The process of claim 1 wherein the waste metal plating solution is comprised of copper metal ions.

5. The process of claim 1 wherein the porous cathodes are comprised of sintered nickel having a porosity of 5 to 100 pores/inch (PPI).
6. The process of claim 1 wherein the waste plating solution has a metal ion content of at least 200 g/liter.
7. The process of claim 1 wherein the waste solution is subjected to metal deposition wherein the solution exiting the cell assembly has a metal ion content as low as 50 g/ liter.
8. The process of claim 1 wherein the deposited metal on the cathodes is fractured into pieces and is used as a source of metal ions in an electrochemical deposition of the metal.
9. The process of claim 1 wherein the waste metal plating solution is obtained from an aqueous rinse bath formed as a result of water washing a plated metal part after the deposition of the metal plate onto a substrate.
10. The process of claim 9 wherein the aqueous solution exiting the electrochemical cell assembly, for removal of metal ions from the waste solution, is recycled back to the aqueous rinse bath.
11. A method of recovering metal from waste plating stream and using the recovered metal comprising:
 - providing a waste metal plating stream containing metal ions in an aqueous solution;
 - passing the waste metal plating stream containing the metal ions into an electrochemical cell assembly having an inlet for the waste metal plating stream, a plurality of alternating anodes and cathodes porous to the waste metal solution and an exit from the cell ;
 - passing the waste metal plating stream through pores of the cathode;

passing an electrical current through the anodes and cathodes, thereby depositing a portion of the metal ions onto the cathodes and reducing the amount of the metal ion in the solution from that in the introduced waste metal plating stream;

recovering the deposited metal from the cathode; and

using the recovered deposited metal as a source of metal to be deposited on to a substrate in a subsequent metal plating process;

wherein the waste metal plating solution is comprised of nickel metal ions; and

wherein the porous cathodes are comprised of sintered nickel having a porosity of 5 to 100 pores/inch (PPI); and

wherein the deposited metal on the cathodes is fractured into pieces and is used as a source of metal ions in an electrochemical deposition of the metal.

12. A method of recovering metal from waste plating stream and using the recovered metal comprising

providing a waste metal plating stream containing metal ions in an aqueous solution;

passing the waste metal plating stream containing the metal ions into an electrochemical cell assembly having an inlet for the waste metal plating stream, a plurality of alternating anodes and cathodes porous to the waste metal solution and an exit from the cell ;

passing the waste metal plating stream through pores of the cathode;

passing an electrical current through the anodes and cathodes, thereby depositing a portion of the metal ions onto the cathodes and

reducing the amount of the metal ion in the solution from that in the introduced waste metal plating stream;

recovering the deposited metal from the cathode; and

using the recovered deposited metal as a source of metal to be deposited on to a substrate in a subsequent metal plating process;

wherein the waste metal plating solution is comprised of nickel metal ions; and

wherein the waste metal plating solution is obtained from a an aqueous rinse bath formed as a result of water washing a plated metal part after the deposition of the metal plate onto a substrate.; and

wherein the aqueous solution exiting the electrochemical cell assembly, for removal of metal ions from the waste solution, is recycled back to the aqueous rinse bath.